United States Department of Agriculture | Forest Service | Southwestern Region | 517 Gold Avenue SW. Albuquerque, NM 87102-0084

Reply to: 3420 **Date:** October 20, 1988

Subject: Western Spruce Budworm Biological Evaluation, 1988

To: Forest Supervisor, Santa Fe National Forest

During July and August, 1988, Forest Pest Management Specialists monitored and evaluated western spruce budworm (WSB), Choristoneura occidentalis, defoliation and insect densities on portions of the Santa Fe National Forest (SFNF). Defoliation was monitored through a combination of aerial detection surveys and ground observations and infestation trends by egg mass surveys and ground observations. Egg mass surveys, used to predict the following years infestation trends, were conducted on portions of the Jemez Ranger District (RD) Pecos RD, and Espanola RD at Forest request. Survey results, prediction of 1989 trends, and management recommendations are summarized in this letter.

Forestwide, WSB defoliation increased from 54,360 acres in 1987 to 217,360 acres in 1988. Defoliation on adjacent lands of mixed ownership including the Jemez and Santa Clara Pueblo Indian Reservations totaled 9,650 acres. These data are summarized in Table 1 by ownership and intensity of defoliation. Figures 1-6 depict levels of defoliation detected in 1988.

Jemez RD--WSB defoliation on this District in 1988 was detected on approximately 22,620 acres. The majority of this defoliation occurred west of the Baca Location No. 1 (Figure 1). Although defoliation was aerially undetectable in the vicinity of the Integrated Forest Protection Demonstration (IFP) Area south of the Baca Location No. 1, ground observations during the egg mass survey revealed light defoliation (<5 percent of new growth) along Forest Road 280.

Egg mass surveys were again conducted in the vicinity of the IFP Demonstration Area as part of a continuing Forest request to monitor the infestation in this project area. The results of this survey and our ground observations seem to indicate WSB activity and defoliation will continue to remain largely undetectable again in 1989. Egg mass densities in 1988 (Table 2) averaged 0.8 egg masses per meter square of foliage. In 1987 the mean sample estimate was 5.3 per meter square.

Pecos RD--Defoliation on the Pecos RD was detected on 14,420 acres in 1988. Defoliation was most conspicuous north of Dalton Canyon from Camp LaSalle north to and including Jacks Creek and Iron Gate Campgrounds (Figure 2). Although defoliation from aerial surveys was largely categorized as light in 1988, observations during the egg mass survey revealed several areas with 3 to 4 years of heavy defoliation (>65 to 100 percent of new growth) in Holy Ghost and Indian Canyons.

The results of our egg mass surveys conducted on this District show WSB activity will continue to cause light amounts of defoliation throughout these areas again

next year. Egg mass densities collected from eight sample points (Table 2) ranged from 3.4 to 10.1 egg masses per meter square of foliage and averaged 6.0 per meter square. In 1987, the mean sample estimate was 15.6 per meter square.

Espanola RD--Defoliation in 1989 was detected on 44,530 acres of host type. The largest areas of contiguous defoliation occurred on the east half of the District northwest of the Santa Fe Municipal Watershed (Figures 3 & 4). Smaller areas of light defoliation were also detected on the west half of the District on the Roladera Land Grant (Figure 4). Although defoliation was not detected in the vicinity of the Pajarito Ski Area, a walk-through examination, while collecting egg masses, revealed some light defoliation.

Egg mass surveys were conducted in the vicinities of the Pajarito Ski Area, the Santa Fe Ski Basin Area and Borrego Campground. The result of these surveys (Table 2) indicate WSB defoliation will continue to remain mostly undetectable at the Pajarito Ski Area and Borrego Campground and light along Forest Roads 101 and 102 leading up to the Ski Basin. No defoliation is expected to occur at the Santa Fe Ski Area itself. Average egg mass densities were: Pajarito Ski Area, 2.6; Santa Fe Ski Basin, 3.4; and Borrego Campground, 1.6.

Coyote RD--Defoliation on this District in 1988 was detected on or over 19,480 acres. Most of the increases detected occurred along the southern boundary of the District, north and northwest of the Baca Location No. 1 (Figure 5). Although no egg masses were collected on this unit, we expect low-level defoliation to continue in 1989.

Cuba RD--Defoliation on this District was aerially detected on 79,810 acres in 1988. Defoliation and associated damages continued to occur along the Sierra Nacimiento Mountains north to San Pedro Parks (Figure 6). Western spruce budworm infestations and subsequent defoliation are expected to continue at about the same level in 1989.

Las Vegas RD--No defoliation was detected on this District in 1988, and we expect the same situation in 1989.

Alternatives

Two general alternatives should be considered for short-term management. These are: (1) No action and (2) direct suppression with insecticides.

For the long-term, silvicultural management is an approach that can be used to reduce susceptibility of effectively treated stands to WSB.

Recommendations

1. For the major portion of the Forest where stands have been chronically defoliated for up to five or more years and permanent tree damages (top-kill and mortality) have already occurred (Jemez, Coyote, and Cuba RDs), we recommend the "no action" approach. Direct suppression with insecticides would not be practical, economical, or effective.

2. For campgrounds, picnic areas, and other high-use visitor sites on the Espanola and Pecos RDs where visual quality could become an issue, we recommend an analysis considering ground-based insecticide treatments be conducted. Postponing the analysis to a later year will likely reduce

effectiveness of suppression treatments, while allowing an increase in defoliation damages.

3. Where opportunities exist to reduce stand susceptibility to future outbreaks using silvicultural techniques, we continue to recommend silvicultural approaches be evaluated under IRM/IFP and implemented as appropriate.

Douglas L. Parker

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Director of Forest Pest Management

Enclosures (8)

cc:
BIA, Albuquerque
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DRF, RES
DRF, S&PF

Table 1--Acres of WSB Defoliation by Ownership and Intensity, Santa Fe National Forest, 1988

Ownership	Light	Moderate	Heavy	Total
Santa Fe NF				
Cuba RD	49,290	30,520	0	79,810
Coyote RD	9,140	47,800	0	56,940
Espanola RD	28,230	16,300	0	44,530
Jemez RD	18,220	4,400	0	22,620
Pecos RD	11,560	2,860	0	14,420
Jemez Pueblo IR	0	3,000	0	3,000
Santa Clara IR	840	2,320	0	3,160
Adjacent State and Private	2,830	660	0	3,490
Total	120,110	107,860	0	227,970

Table 2--Egg Mass Survey Results, Santa Fe National Forest, 1988

Plot	Locale	EM/M^2	1989 Prediction
Jemez RD			
IPM Demonstration			
1	FS Road 280	1.9	
2	FS Road 280	1.3	
3	FS Road 280	0.0	
4	FS Road 280	0.0	
4 Plots	IPM Demo Area $\bar{X}$ =	0.8 (S.E. 0.5)	Undetectable
Espanola RD			
Pajarito Ski Area			
1	Camp May	1.1	
2	Camp May	1.7	
3	Road 282	1.9	
4	Road 282	5.8	
4 Plots	Pajarito $\bar{X}$ =	2.6 (S.E. 1.0)	Undetectable to Light
Santa Fe Ski Area			
5	Black Canyon	4.0	
6	Borrego	6.6	
7	Big Tesuque	1.4	
8	Pacheco Canyon	2.4	
9	Pacheco Canyon	2.3	
5 Plots	Santa Fe Ski Area $\bar{X}$ =	3.4 (S.E. 0.9)	Light
Borrego Mesa			
10	Borrego Campground	0.7	
11	Borrego Campground	2.4	
2 Plots	Borrego $\bar{X}$ =	1.6 (S.E. 0.9)	Undetectable to Light
Pecos RD			
1	Jacks Creek Campground	10.1	
2	Jacks Creek Campground	8.6	
3	Watson Creek	5.8	
4	Panchela Campground	3.4	
5	Iron Gate Campground	5.3	
6	Holy Ghost Canyon	3.6	
7	Indian Creek	4.4	
8	Indian Creek	6.9	
8 Plots	Pecos Drainage $\bar{X}$ =	6.0 (S.E. 0.9)	Light

1988 AERIAL DETECTION SURVEY

DOUGLAS-FIR, TRUE FIR, SPRUCE DEFOLIATION

WESTERN SPRUCE BUDWORM

L-LIGHT, M-MEDIUM, H-HEAVY

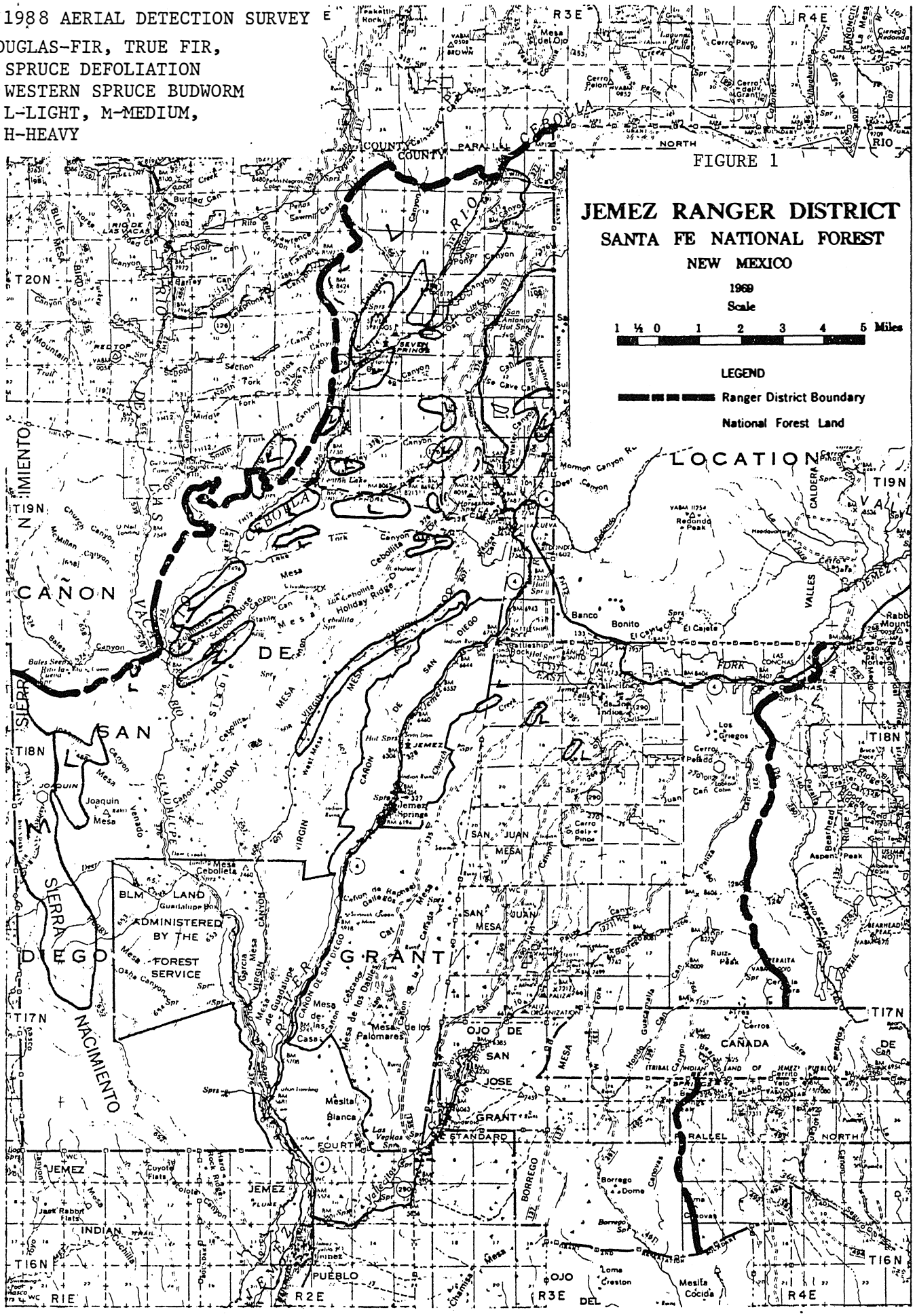

FIGURE 1

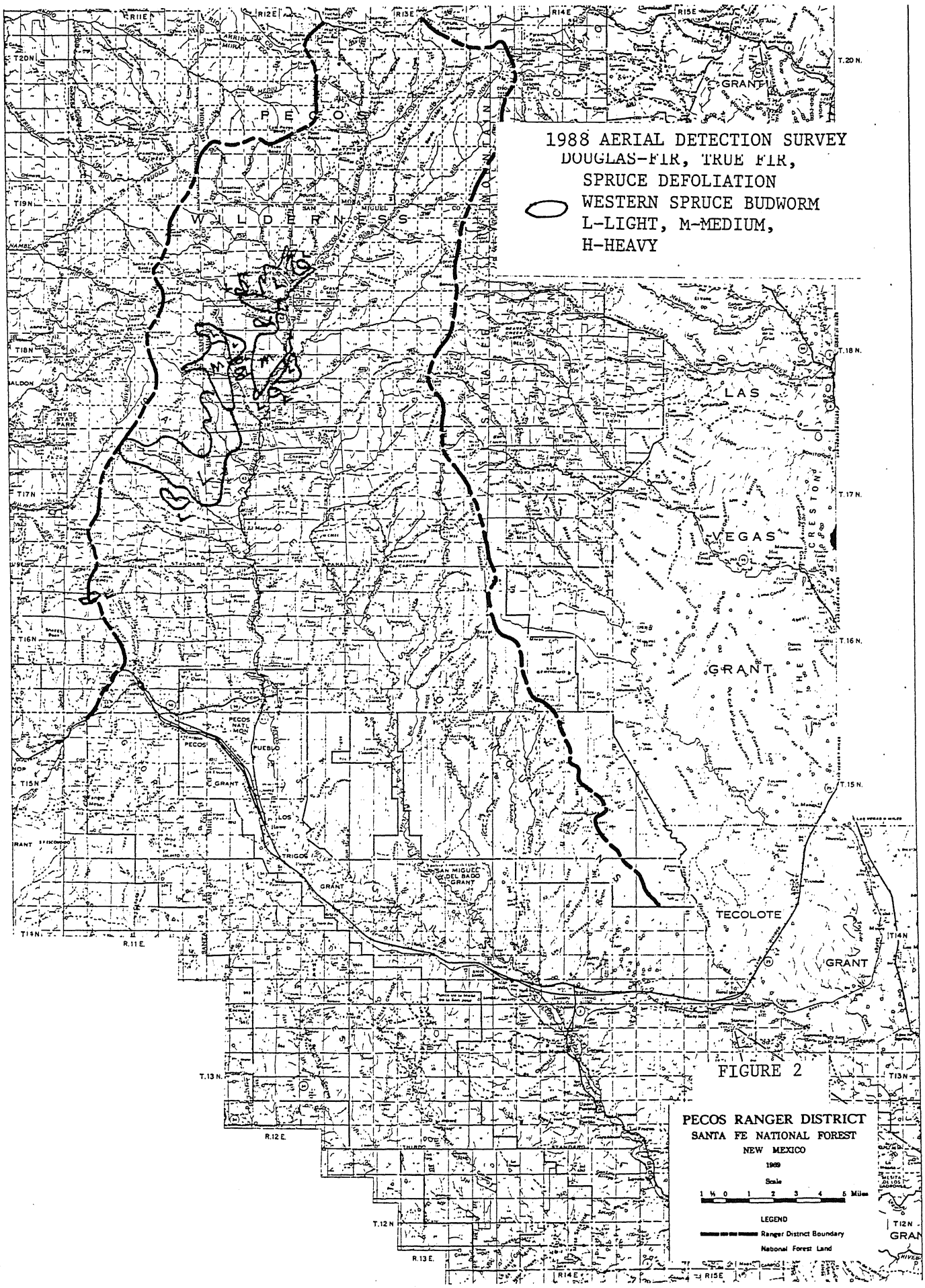
1988 AERIAL DETECTION SURVEY
DOUGLAS-FIR, TRUE FIR,
SPRUCE DEFOLIATION
WESTERN SPRUCE BUDWORM
L-LIGHT, M-MEDIUM,
H-HEAVY
PECOS
WILDERNESS
SANTA FE NATIONAL FOREST
LAS VEGAS
GRANT
TECOLOTE
PECOS RANGER DISTRICT
SANTA FE NATIONAL FOREST
NEW MEXICO
1989
Scale
1 ¼ 0 1 2 3 4 5 Miles
LEGEND
Ranger District Boundary
National Forest Land

FIGURE 2

1988 AERIAL DETECTION SURVEY

DOUGLAS-FIR, TRUE FIR,
SPRUCE DEFOLIATION
WESTERN SPRUCE BUDWORM
L-LIGHT, M-MEDIUM,
H-HEAVY

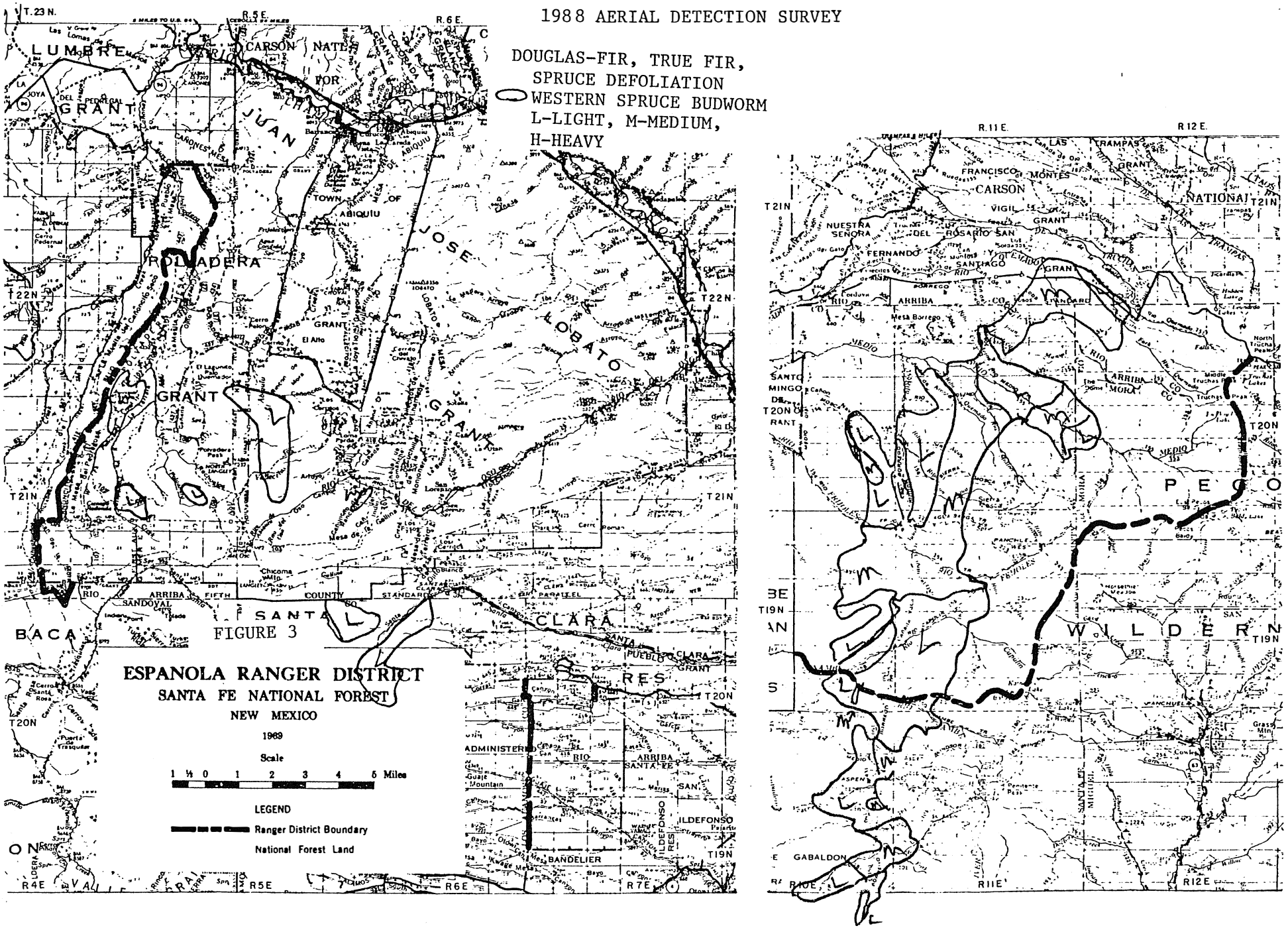

FIGURE 3

ESPANOLA RANGER DISTRICT
SANTA FE NATIONAL FOREST
NEW MEXICO
1969
Scale
1 ½ 0 1 2 3 4 5 Miles

LEGEND
Ranger District Boundary
National Forest Land

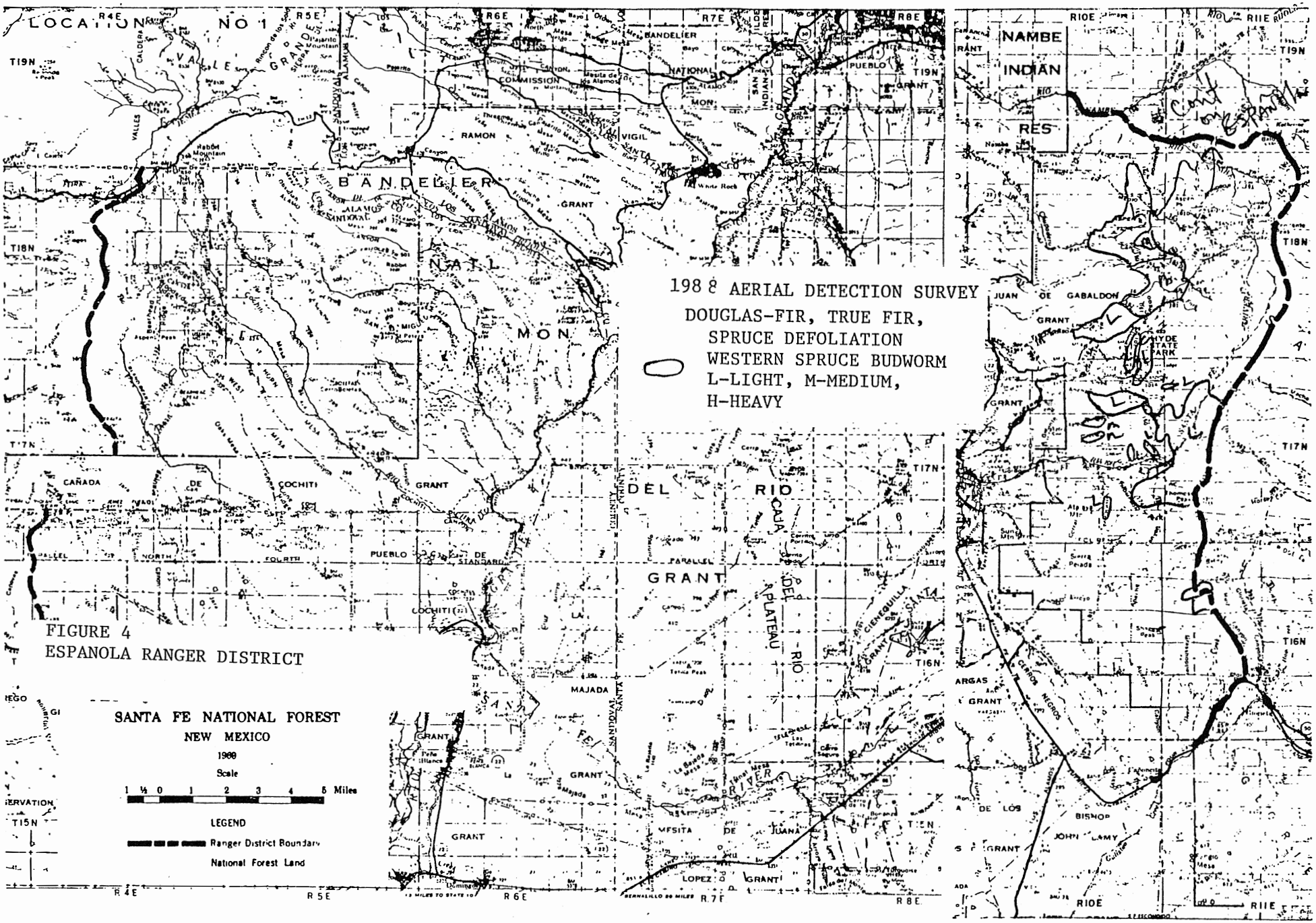

FIGURE 4
ESPANOLA RANGER DISTRICT

1988 AERIAL DETECTION SURVEY

DOUGLAS-FIR, TRUE FIR,
SPRUCE DEFOLIATION
WESTERN SPRUCE BUDWORM
L-LIGHT, M-MEDIUM,
H-HEAVY

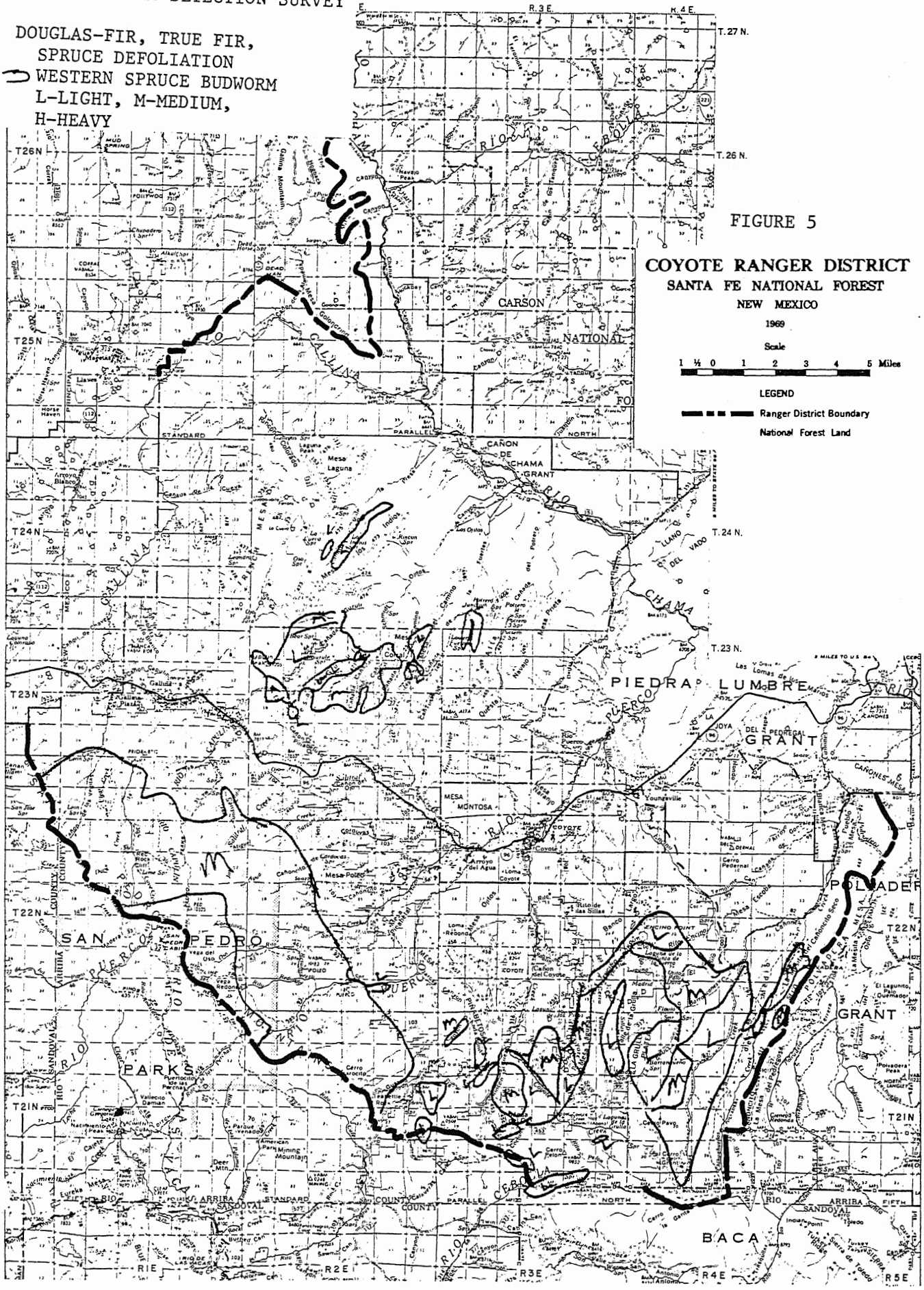

FIGURE 5

COYOTE RANGER DISTRICT
SANTA FE NATIONAL FOREST
NEW MEXICO
1969

Scale
1 ½ 0 1 2 3 4 5 Miles

LEGEND
Ranger District Boundary
National Forest Land

1988 AERIAL DETECTION SURVEY

DOUGLAS-FIR, TRUE FIR, SPRUCE DEFOLIATION

WESTERN SPRUCE BUDWORM
L-LIGHT, M-MEDIUM, H-HEAVY

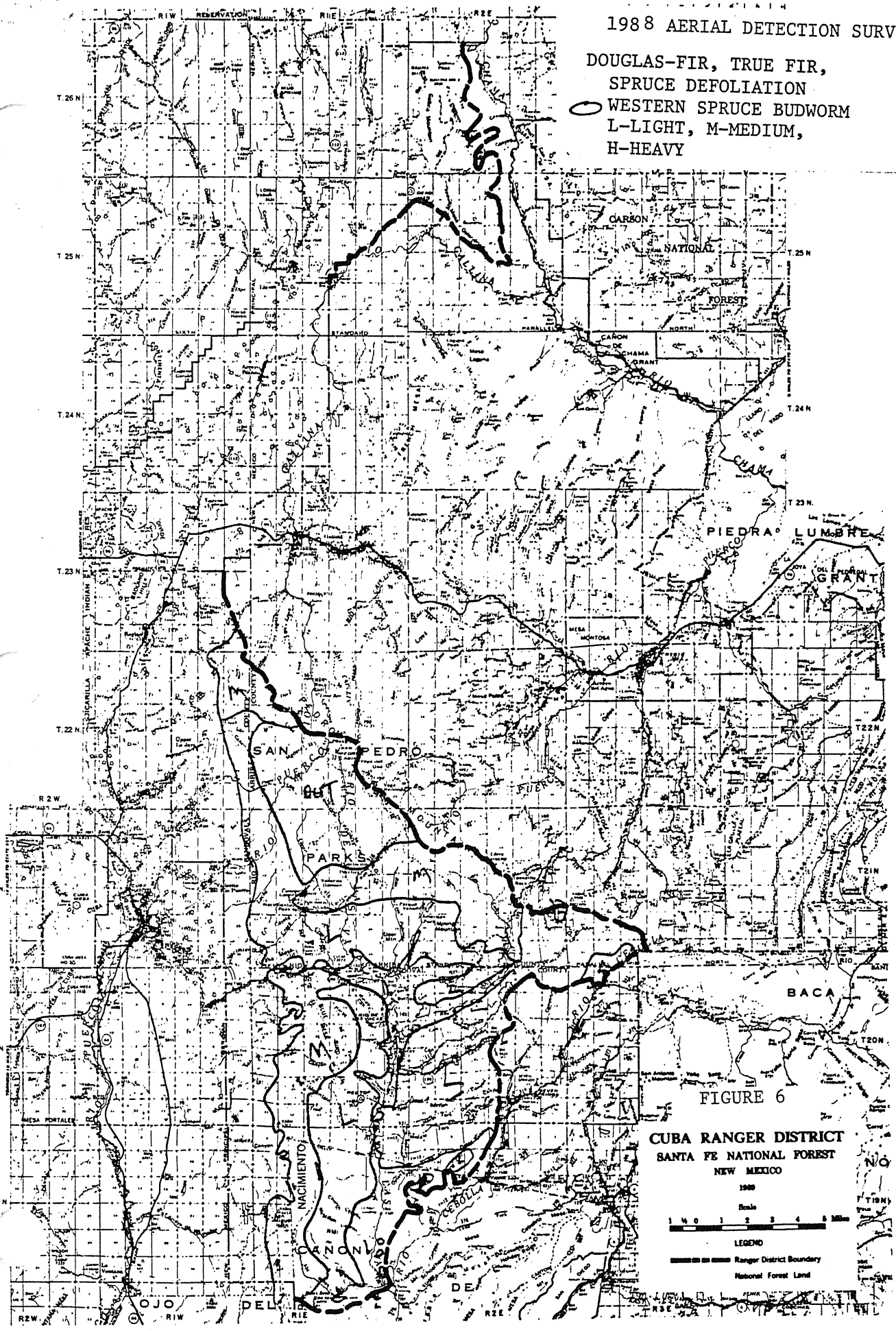

FIGURE 6

CUBA RANGER DISTRICT
SANTA FE NATIONAL FOREST
NEW MEXICO
1988

Scale
1 MILE 0 1 2 3 4 5 Miles

LEGEND
Ranger District Boundary
National Forest Land